Claims

What is claimed is:

1. A method of designing a clock tree in an integrated circuit comprising the steps of:

collecting a set of sink locations 3 in a master list and a set of blocked areas 47;

(a) selecting a temporary insertion point (TIP) 4, 5;

(b) enclosing the sink 41 at the first level furthest from the TIP in a bin 40 that includes a first subset of sinks 43 and remove the first subset from the master list;

(c) assigning a first-level structured clock buffer (SCB) 42 to the bin;

repeating steps (a), (b) and (c) above for the remaining sinks in the first level of buffers and subsequent levels until the root level is reached;

improving the symmetry of the tree by moving SCB 45 locations within constraints 46 to concentrate SCBs in rows and columns;

connecting the root level TIP 610 to lower levels; and

connecting a source (S) of clock signals to the root level TIP.

2. A method according to claim 1, in which said step (a) of selecting a TIP (4,5) comprises calculating a center 4 of sinks and a centroid 5 of sinks and automatically placing said TIP at one of said center, centroid or an intermediate point between said center and centroid in accordance with an algorithm that locates available space.

3. A method according to claim 2, in which said step (a) of selecting a TIP (4,5) comprises calculating a center 4 of sinks and a centroid 5 of sinks and

automatically placing said TIP at one of said center 4, centroid 5 or an intermediate point between said center and centroid in accordance with an algorithm that locates selectively weights one or more of delay, power consumed and placability.

4. A method according to claim 1, in which said step (c) of assigning a first-level SCB 42 to the bin comprises steps of attempting to place a horizontal SCB 42, then attempting to place a vertical SCB 42 in a central location when a horizontal SCB will not fit in said central location.

5. A method according to claim 4, in which said vertical SCB comprises a set of circuit elements laid out to have substantially the same delay as a corresponding SCB with horizontal layout.

6. A method according to claim 1, in which said step of improving symmetry comprises a step of calculating for each of a set of columns and rows a potential improvement in symmetry of SCBs 45 in an nth level of said tree and moving SCBs 45 to improve symmetry.

7. A method according to claim 6, in which some designated SCBs 142 are excluded from the calculation in said step of improving symmetry, whereby only a subset 45 of SCBs are included in the calculation.

8. A method according to claim 6, in which the amount of movement permitted to improve symmetry 46 is restricted to a preset amount.

9. A method according to claim 1, in which said SCB 42 assigned to a subset of sinks is selected from a set of predesigned SCBs of varying capacity.

10. An article of manufacture in computer readable form which encodes a set of instructions for performing a method according to any of claim 1 through claim 9.

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